



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
CARIBBEAN ENVIRONMENTAL PROTECTION DIVISION  
CENTRO EUROPA BUILDING, SUITE 417  
1492 PONCE DE LEON AVENUE, STOP 22  
SAN JUAN, PR 00907-4127

JUN 22 2017

**CERTIFIED MAIL /RETURN RECEIPT REQUESTED**

**7015 0920 0000 8688 5078**

Mr. Alvin E. Crespo, Director  
Environmental Health and Safety  
Bristol-Myers Squibb Manufacturing Company  
Humacao Operations  
P.O. Box 609  
Humacao, Puerto Rico, 00792-1255

Re: Technical Review of the response to Comments on the March 2016 Release Assessment Sampling and Analysis Plan for the Bristol-Myers Squibb Manufacturing Company, Humacao, Puerto Rico  
EPA ID Number: PRD 090021056

Dear Mr Crespo:

The United States Environmental Protection Agency-Region 2 (EPA) has reviewed the Report for the response to Comments on the March 2016 Release Assessment Sampling and Analysis Plan in letter dated November 21, 2016, for Bristol-Myers Squibb Manufacturing Company (BMSMC) in Humacao, Puerto Rico. Enclosed are the EPA's comments on the Report. Please provide your response to the enclosed comments within 30 days of receipt of this letter. If you have any questions regarding this correspondence, please contact Socorro Martinez of my staff at (787) 977-5886 or via email at [martinez.socorro@epa.gov](mailto:martinez.socorro@epa.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "C. Guerrero-Pérez", is placed below the word "Sincerely,".

Carmen R. Guerrero-Pérez  
Director  
Caribbean Environmental Protection Division

cc: Manuel O. Claudio Rodriguez, Manager,  
Land Pollution Control Program, PREQ

Enclosure

**TECHNICAL REVIEW**  
**RESPONSE TO US EPA COMMENTS**  
**ON THE**  
**MARCH 2016 RELEASE ASSESSMENT SAMPLING AND ANALYSIS PLAN**  
**BRISTOL MYERS SQUIBB MANUFACTURING COMPANY**  
**HUMACAO, PUERTO RICO**

**I. INTRODUCTION**

The following is a technical review of the Response to Comments (RTCs) on the March 2016 Release Assessment Sampling and Analysis Plan (SAP) for the Bristol-Myers Squibb Manufacturing Company (BMSMC) in Humacao, Puerto Rico. Our review indicates that BMSMC has determined that a revision of the Release Assessment SAP would not be constructive because the activities described in the document have been completed. Instead BMSMC has provided excerpts from the Release Assessment SAP, as Attachment 1, to address U.S. EPA and Puerto Rico Environmental Quality Board (PREQB) comments. Although majority of the RTCs are acceptable, it is unclear whether they were adequately incorporated into a revised Release Assessment SAP as a revised version of the document was not submitted for review. The following provides a review of the adequacy of the BMSMC responses to EPA and PREQB comments. Note the original comments and BMSMC responses are repeated below for clarity.

**II. GENERAL COMMENTS**

**1. Original U.S. EPA Comment:**

Although the current use of the BMSMC facility is industrial/commercial and a future deed restriction may ensure that remains the case, soil and groundwater data should also be compared to the residential RSLs due to the potential for off-site migration of groundwater contamination. On-site groundwater and soil should also be characterized to the residential RSLs so that the potential for newly identified Chemicals of Concern (COCs) to migrate off-site can be established and fully characterized. Please revise the approach in the Phase 1 Release Assessment Sampling and Analysis Plan (Phase 1 SAP) accordingly.

**BMSMC Response:**

Both on-site and off-site soil and groundwater data will be compared to residential RSLs. This will be stated in future release assessment Work Plans and the requested comparison will be included in future technical reports.



**U.S. EPA Response:**

The response to this comment is acceptable; however, since a revised Phase 1 SAP was not provided for review so it is unclear whether this response was adequately incorporated into the Phase 1 SAP.

**III. SPECIFIC COMMENTS**

***Section 3.2., Step 2: Identify the Decision, Page 11 and Quality Assurance Project Plan (QAPP) Worksheet # 11: Project/Data Quality Objectives, Pages 18-19***

**2. Original U.S. EPA Comment:**

The Phase I SAP activities are not discussed with regards to the principal study questions and potential alternative actions. Please revise and explain how the Phase 1 SAP activities address the principal study questions and what potential alternative actions are proposed (i.e., Phase 2 and Phase 3 activities).

**BMSMC Response:**

The Phase 1 SAP activities to address the principal study questions included the collection of soil and groundwater analytical data as well as the collection of groundwater elevation data from existing and new monitoring wells to evaluate groundwater flow and transport characteristics. Specifically, soil and groundwater data collected along the downgradient perimeter of the Facility will be used to evaluate the need to complete offsite sampling (a Phase 2 activity). Soil and groundwater data collected in the interior of the site will be used to evaluate if additional onsite sampling is needed to characterize the nature and extent of COPCs onsite (a Phase 3 activity). Additional details regarding the use of the soil and groundwater data that will be collected during the Phase 1 Field Program are provided in Section 3.5 of the Phase 1 SAP (Step 5: Develop the Analytical Approach).

**U.S. EPA Response:**

The response to this comment is acceptable; however, Worksheet #11 provided in Attachment A1 was not updated to reflect this response. Please revise Worksheet #11.

***Section 3.3., Step 3: Identify the Decision, Page 12 and QAPP Worksheet #11: Project/Data Quality Objectives, Page 20***

**3. Original U.S. EPA Comment:**

Presently, organochlorine pesticides sampling is proposed for the perimeter, upgradient, near Building 5, and in a subset of the interior samples. However, if organochlorine pesticides results are detected above the proposed action levels for these samples additional interior or off-site samples may be warranted during Phase 2 or 3 activities to fill the data gaps across the BMSMC Humacao Facility.

**BMSMC Response:**

Additional interior and/or off-site samples may be warranted for organochlorine pesticides analysis based on the results of the Phase 1 sampling. Organochlorine Pesticide sampling will continue to be evaluated going forward. Revised QAPP Worksheet #11 which is included in **Attachment A1**, will be incorporated into all future QAPPs for this project, as appropriate.

**U.S. EPA Response:**

The response to this comment is acceptable and Footnote 1 on Page 19 of 96 adequately incorporates the response into Worksheet #11.

***Section 3.4, Step 4: Define the Boundaries of the Study, Define the Temporal Boundaries of the Decision, Page 15***

**4. Original U.S. EPA Comment:**

The second paragraph of this subsection states: "...Facility use is expected to remain unchanged into the foreseeable future and a deed restriction limiting the use and development of the facility to non-residential used will be incorporate as part of the final corrective measure for the facility. Therefore, the temporal boundary for soil analytical data will be definite as average exposure duration for a facility worker, which is 25 years." Typically, defining the temporal boundaries of the decision refers to the age and representativeness of the data that will be used as inputs to the decision and is not tied to the average exposure duration for receptors at the site. For example, a project team may decide that the volatile organic compound (VOC) groundwater data must be less than 5 years old to be considered representative of recent conditions and usable for their specific decision(s). Please revise this subsection to discuss the temporal boundaries for analytical sample data and what will be considered usable for decision making purposes.

**BMSMC Response:**

As a conservative approach, all historical data, regardless of the age of the data, were used during the initial Release Assessment to identify COPCs at the Facility. With this approach, all analytical data were given the same weight of importance whether the sample was collected 20 years ago or within the last five years.

Soil and groundwater field activities for the Phase 1 Release Assessment Field Program began in April 2016 and are anticipated to be completed in 2017. Analytical data collected during the Phase 1 Release Assessment Field Program will be used to represent current soil and groundwater quality conditions.

As part of the risk assessment, an exposure duration of twenty-five years will be assumed. Revised QAPP Worksheet #11 which is included in **Attachment A1**, will be incorporated into all future QAPPs for this project, as appropriate.

**U.S. EPA Response:** The response to this comment is acceptable and the response was adequately incorporated into Worksheet #11.



***Section 3.5, Step 5: Develop the Analytical Approach, Pages 17-18 and QAPP Worksheet #11, Page 2***

**5. Original U.S. EPA Comment:**

The text states that a minimum of four rounds of quarterly samples will be collected from the new monitoring wells to confirm that groundwater concentrations remain below action levels. However, a rationale should be provided to support that four rounds of quarterly sampling is an adequate amount of data should be provided. Although the historical COCs concentration trends show that the contaminant plumes were generally stable, the concentration trends for the newly identified COCs have not been established yet and four rounds of quarterly sampling data may not be adequate. Please revise the Phase I Release Assessment SAP to provide additional detail and discussion on the process of eliminating constituents of concern.

**BMSMC Response:**

Four rounds of groundwater samples will be collected from the new monitoring wells to establish baseline groundwater quality conditions for the COPCs. Based on review of the four rounds of groundwater analytical data collected from the new monitoring wells installed on-site and off-site, in conjunction with the expanded sampling of historic monitoring wells at the site as part of quarterly groundwater sampling, recommendations for future groundwater sampling will be developed including the adequacy of the data set and the rationale for eliminating any COPCs. The presence or absence of COPCs in groundwater, and their relationship to proposed action levels, will be a key component in the elimination process.

Revised QAPP Worksheet #11 which is included in **Attachment A1**, will be incorporated into all future QAPPs for this project, as appropriate.

**U.S. EPA Response:**

The response to this comment is acceptable and the response was adequately incorporated into Worksheet #11.

***Section 3.7, Step 7: Optimize the Design for Obtaining Data, Pages 19-20***

**6. Original U.S. EPA Comment:**

The text does not presently discuss soil gas or indoor air sampling as proposed in the Phase I Release Assessment SAP. Please revise this section to discuss all media that will be sampled.

**BMSMC Response:**

The Phase 1 SAP was limited to the evaluation of groundwater and soil conditions at the facility. As discussed in the Phase 1 SAP and this response to comments, groundwater analytical results will be compared to applicable residential and commercial groundwater screening levels for vapor intrusion. Any compound detected in groundwater above a residential or commercial groundwater screening level for vapor intrusion will be

evaluated as part of the ongoing site-wide vapor intrusion assessment (e.g., a future Phase 3 activity to finalize site delineation).

In response to prior USEPA comments on the July 2011 CMS Report, a comprehensive site-wide vapor intrusion assessment is being conducted at the facility to evaluate potential health risks associated with vapor intrusion into occupied or potentially occupied buildings. The Supplemental Vapor Intrusion Investigation Report Buildings 7, 8, 15, 18, 30 and 42 (September 2016) is the third of a series of reports submitted to the USEPA and PREQB designed to evaluate the vapor intrusion pathway at the facility.

Revised QAPP Worksheet #11 which is included in **Attachment A1**, will be incorporated into all future QAPPs for this project, as appropriate.

**U.S. EPA Response:**

The response to this comment is acceptable and the response was adequately incorporated into Worksheet #11.

***Section 4.2.1, General Drilling Procedures, Pages 23-24***

**7. Original U.S. EPA Comment:**

Since the field standard operating procedures (SOPs) in Appendix B are generic, it is recommended that this section be expanded to provide a more thorough site-specific discussion of the drilling procedures utilized at BMSMC Humacao Facility.

**BMSMC Response:**

All soil borings, including soil borings for monitoring wells, will be completed using either a truck-mounted or track-mounted direct push drill rig. The specific drill rig used at each sample location will depend on accessibility as many of the proposed sample locations are in off-road areas. Soil cores for Phase 1 samples collected to-date were collected using decontaminated 4-foot Geoprobe 2.25 inch diameter Macro-Core samplers equipped with a disposable PVC liner. Macro-Core samplers were decontaminated between each 4-foot sample interval. A detailed discussion of the logging and sampling of the soil cores is provided in Section 4.2.2 of the Phase 1 SAP.

Monitoring wells for Phase 1 wells installed to-date were installed using a track-mounted rig equipped with 4.25 inch hollow stem augers. Soil samples were not collected during the installation of the monitoring wells because pilot borings were advanced at these locations and sampled as described above.

**U.S. EPA Response:**

The response to this comment is acceptable; however, since a revised Release 1 SAP with Section 4.2.1 was not provided for review it is unclear whether this response was adequately incorporated into the Phase 1 SAP.



## ***QAPP Worksheet #36: Data Validation Procedures, Page 87-91***

### **8. Original U.S. EPA Comment:**

This worksheet does not provide the flagging conventions that will be used to validate the data when quality assurance/quality control samples or procedures are outside of control limits. Please update this worksheet to provide this information.

### **BMSMC Response:**

Flagging conventions (i.e., data qualifiers) that will be used to validate the data when quality assurance/quality control samples or procedures are outside of control limits were included in Worksheet #36 (Data Validation Procedures). No changes are warranted.

### **U.S. EPA Response:**

The response to this comment is partially adequate. Based on a review of the data validation reports associated with the Release Assessment, BMSMC intends to use U.S. EPA's Hazardous Waste Support Section Standard Operating Procedures (SOPs) for data validation. This approach is acceptable, but Worksheet #36 should reference these SOPs for the appropriate flagging conventions and the SOPs should be provided as part of the Phase 1 SAP.

## **IV. Puerto Rico Environmental Quality Board (PREQB) Comments on the March 2016 Phase I Release Assessment Sampling and Analysis Plan**

### **1. Original PREQB Comment:**

Table 1 list 43 new compounds of potential concerns, however the tables including the action levels does not included the 43, please provide a justification.

### **BMSMC Response:**

Table 1 has been updated to include the COPCs that were identified in the revised November 2016 Final Release Assessment Report as well as the current COCs for the FTF and Building 5 Areas.<sup>1</sup> Subsequent Tables 2 through 5 include compounds that were only identified as COPCs in specific media. As such, each individual table does not include 52 COPCs; however, each of the 52 unique COPCs is addressed in at least one of the media-specific tables (Tables 2 through 5). A revised Table 1 is provided in Attachment A2.

### **Recommendation:**

The response to this comment is acceptable and adequately incorporated into Table 1.

## **V. QUALITY ASSURANCE/QUALITY CONTROL REVIEW COMMENTS**

A thorough evaluation of the Release Assessment Sampling and Analysis Plan (March 25, 2016) Quality Assurance Project Plan showed that it was prepared in compliance with the requirements

---

<sup>1</sup> As discussed in the revised November 106 Final Release Assessment Report, 1,2-Dichloroethane, 1,1,2,2-Tetrachloroethane, Bromodichloromethane, 1,3-Butadiene, Carbon Tetrachloride, Benzo(a)pyrene, gamma-Chlordane, Heptachlor, and Heptachlor Epoxide have been identified as new COPCs based on a comparison of the Release Assessment data to USEPA residential and/or PRWQS screening levels.

established and contain all of the elements required in both in the EPA Requirements for Quality Assurance Project Plans - QA/R-5 (EPA/240/B-01/003, March 2011) and the Uniform Federal Policy for Quality Assurance Project Plans (EPN505/B-04/900A, March 2005). However, the following comments and recommendations are being issued for EPA consideration:

***Sampling and Analysis Plan:***

**2. Original PREQB Comment:**

Section 3.1, Page 10 (Available Resources and Constraints): In the table of the "Available Resources and Constraints", the data validator was included. Please clarify if this data validator will also perform the data certification required by the Puerto Rico Laws and the PREQB Regulation for the Control of Hazardous Solid Wastes.

**BMSMC Response:**

The data validator will perform the data certification required by the Puerto Rico Laws and the PREQB Regulation for the Control of Hazardous Solid Wastes. Data validation for Phase 1 sampling conducted to-date was performed by a certified PR Licensed Chemist, Rafael Infante of Ponce, PR.

**Recommendation:**

The response to this comment is acceptable and no changes to this SAP are needed.

**3. Section 3.3, Page 13 and Section 3.5, Page 16 (Action Levels):**

**a. Original PREQB Comment:**

The document indicates the date of the EPA Regional Screening Levels (RSL) that will be used as Action Levels for soil and groundwater, it should also specify if it's referring to the industrial or residential RSLs and where and how residential, industrial and/or commercial will be applied.

**BMSMC Response:**

As discussed in the response to General Comment 1, soil and groundwater analytical data will be compared to both residential and commercial EPA screening levels provided in May 2016 Regional Screening Levels for Chemical Contaminants at Superfund Sites (<https://www.epa.gov/risk/regional-screening-levels-rsls>). In addition, as described below (BMSMC response to PREQB Comment 3.b.), groundwater data will be compared to the April 2016 PRWQS, as available.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into tables provided in Attachment A4.

**b. Original PREQB Comment:**

In addition, it indicates that, whenever there are no established RSLs, PREQB action levels will be considered but does not make reference to what specific EQB action levels. If it is referring to the EQB's Puerto Rico Water Quality Standard Regulation (As



amended in April 27, 2016) (PRWQS), which may be more stringent for certain contaminants, it needs to mention the specific standards within this regulation which will be used as action levels, and there of all the actions levels available and applicable, the more stringent should be selected instead of using the PRWQS only when there is no established RSLs.

**BMSMC Response:**

The April 27, 2016 PRWQS will not only be used when there is no RSL and a PRWQS exists, but will also be used if the PRWQS is more stringent than the USEPA RSL for a particular compound. In addition, action levels provided in the December 2014 PREQB Regulations for the Control of Underground Storage Tanks (EQB, 2014) will be used for compounds for which a USEPA RSL and PRWQS has not been established (e.g. tert-Butyl Alcohol). Each Phase 1 SAP table that includes references to proposed action levels has been updated to include a reference to the source of the proposed action level. In addition, tables provided in the September 2016 Release Assessment Phase 1 Technical Memorandum will be updated as necessary.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into the SAP and QAPP table notes in Attachments A3 (Table 2), A4 (Table 4), A5 (Table 6), A6 (Table 7), and A13 (QAPP Worksheet #15). However, QAPP Worksheet #11: Project/Data quality Objectives (Page 20 of 96) still states:

*"The November 2015 USEPA soil and groundwater Regional Screening Levels (RSLs) and Target Groundwater Concentrations for Vapor Intrusion are the primary sources for action levels Secondary sources for COPCs, for which the USEPA has not established RSLs or target groundwater concentrations for vapor intrusion include PREQB and state-specific screening /actions levels."*

The text of QAPP Worksheet #11 should be updated to indicate that the PRWQS will be used if it is more stringent than the USEPA RSLs.

**Original PREQB Comment:**

This specific information needs to be incorporated into the document. Section 3.3 should make reference to all of the Tables in the document indicating the Action Levels selected for this project (i.e. Tables 2-5).

**Recommendation:**

BMSMC specifically addressed Comment #3a and #3b, but it is not clear if Section 3.3 was updated as requested by PREQB in Comment #3 since it was not provided in the attachments. Text in Section 3.3 should be updated accordingly.

4. **Original PREQB Comment:**

Section 4.0, Page 21 (Sampling and Analysis Plan), and Figure 5 (Proposed Release Assessment Soil Boring and Monitoring Well Location): The amount of sampling

locations illustrated in Figure 5 of the document is not consistent with the amount of samples being proposed in this section. Please revise and clarify.

**BMSMC Response:**

In Section 4.0 (p.21) 36 soil borings were proposed for the Phase 1 Field Program. Twenty-four of the thirty-six soil boring locations (RA-1 through RA-20 and SB-101 through SB-104) were proposed to collect shallow and deep in situ groundwater samples. Five of the thirty-six soil borings were proposed as shallow monitoring wells (BR-4, MW-19, MW-21S, MW-22S, and MW-23S). Six of the soil boring locations were proposed as paired monitoring wells (MW20S/MW20D, S-39S/S-39D, S-40S/40D, S-41S/41D, S-42S/42D, and S-43S/43D). One soil boring (S-35) was proposed as a deep monitoring well (S-35D). The locations are consistent with the proposed locations presented in Figure 5 as well as Table 4. During the implementation of the Phase 1 Field Program completed to-date, soil location RA-10 was replaced with a monitoring well pair (RA-10S/RA-10D), which was a change from the originally submitted Phase 1 SAP.

**Recommendation:**

The response to this comment is acceptable and no changes to this SAP are needed.

5. **Original PREQB Comment:**

Section 4.2.2. Page 24 (Collection and Analysis of Soil Samples), 1st and 2<sup>nd</sup> Paragraph): This paragraphs indicates that samples will be collected in decontaminated 2-foot split-spoon samplers in the case of sampling using a Hollow Stem Auger. However, it does not indicates that the macrocore plastic liners will be placed in decontaminated stainless steel macro-core samplers. Notice that, although unused and disposable plastic liners are used with the direct push equipment, the stainless steel macro-cores must be decontaminated to prevent cross contamination. Both this section of the SAP and SOPs SS-1 and ED-1, need to indicated that the stainless steel macro-cores to be used will be decontaminated before placing the plastic liner and after collecting the samples.

**BMSMC Response:**

As discussed in the response to specific comment No. 6, all soil borings were completed using direct push drilling methods. Soil cores were collected using decontaminated 4-foot Geoprobe 2.25 inch diameter Macro-Core samplers equipped with a disposable PVC liner. Macro-Core samplers were decontaminated between each 4-foot sample interval. In all instances, the macro-cores were decontaminated before placing the plastic liner and after collecting the samples.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into SOP No. SS-1.

6. **Section 4.2.2, Pages 24-26 (Collection and Analysis of Soil Samples):**

a. **Original PREQB Comment:**



In various portions of this section the information on the parameters for which the samples will be analyzed for was included; however, there is no information regarding the order of collection of the different fractions of each sample, the provided SOP was revised and this information was not included, neither. The following order of fraction collection for each soil sample should be indicated in the document, as well as in the SOPs included in Appendix B:

- VOCs
- Low Molecular Weight Alcohols
- VPH
- Semi volatile organic compounds
- Organochlorine Pesticides (when applicable)
- 1,4-Dioxane and Naphthalene
- EPH

**BMSMC Response:**

Discrete soil samples were collected for VOCs, VPH, and low molecular weight alcohols. These samples were collected in the following order:

- VOCs
- VPH
- Low Molecular Weight Alcohols

It is noted that soil samples for VPH analysis were collected prior to those for Low Molecular Weight Alcohols since VPH constituents have higher vapor pressure. The order of the collection of these three fractions is different from that recommended by PREQB, but is technically sound.

The sample volume used for the collection of SVOCs, including SIM analysis for 1,4-Dioxane and Naphthalene, EPH, and organochlorine pesticides, if collected, was placed into a decontaminated stainless steel bowl and homogenized using a decontaminated stainless-steel spoon. The homogenized soil was then placed in two sample containers. The first container included the sample volume for SVOC, SIM analysis for 1,4-Dioxane and Naphthalene, and organochlorine pesticides (when applicable). The second container included the sample volume for EPH analysis.

Future Work Plans will list the order of collection of the sampling parameters.

**Recommendation:**

The response to this comment is acceptable but the revised SOPs provided in Attachment A8 do not appear to incorporate the PREQB requested changes and should be revised accordingly since they will be used in future work plans.

**b. Original PREQB Comment:**

No information on the homogenization of the soil samples after the collection of the volatiles fractions (VOCs, Low Molecular Weight Alcohols & VPH), including in the SOPs, was provided. Whether or not this will be performed, needs to be clarified in the SAP. Whether or not the homogenization of the soil samples after the collection of the volatiles fractions (VOCs, Low Molecular Weight Alcohols & VPH), including in the SOPs, will be performed need to be clarified. In addition, the SOPs and the sections in the SAP referring to the collection of soil samples, needs to include information on the homogenization process. Notice that proper homogenization ensures that the containerized samples are representative of the total soil sample collected. Nevertheless, sample fractions to be analyzed for volatile compound analysis do not need to be homogenized.

**BMSMC Response:**

After the collection of discrete samples for VOC, VPH, and Low Molecular Weight Alcohols analysis, the remaining sample volume was placed into a decontaminated stainless steel bowl and homogenized using a decontaminated stainless-steel spoon. The homogenized soil was then placed in two sample containers. The first container included the sample volume for SVOC, SIM analysis for 1,4-Dioxane and Naphthalene, and organochlorine pesticides (when applicable). The second container included the sample volume for EPH analysis.

**Recommendation:**

The response to this comment is acceptable and the revisions to SOP SS-1 (provided in Attachment A8) adequately incorporate this comment.

7. **Original PREQB Comment:**

Section 4.2.3. Page 27 (Collection and Analysis of Groundwater Samples from Direct Push Soil Borings), QA/QC Samples: At the end of this section the field QA/QC samples that will be collected are mentioned, but this list does not includes the MS/MSD for the groundwater samples. Notice that this blank is included in Worksheet 28-1 of the QAPP. The list of the field QA/QC sample needs to be revised so it includes the MS/MSD for the groundwater samples. Also, the narrative may refer the reader to the specific worksheet (Worksheet 28-1) of the QAPP where the information about the type, rationale, and frequency of QA/QC sample collection is located.

**BMSMC Response:**

MS/MSD samples were collected as part of the Phase 1 Field Program completed to-date. The list of QA/QC samples will be revised to include MS/MSD samples in the text of future Work Plans. As noted by PREQB, MS/MSD samples are included in QAPP Worksheet 28-1.

**Recommendation:**

Since MS/MSD samples were collected during the Phase 1 Field Program, the response to this comment is acceptable. However, note that QAPP Worksheet #28 (Attachment A14) does not indicate that project-specific MS/MSD samples are required at a frequency of 1 per 20 samples and should be updated accordingly.



8. **Original PREQB Comment:**

Section 4.3. (Groundwater Sampling and Analysis), Pages 28-29: In various portions of this section the information on the parameters for which the samples will be analyzed for was included; however, there is no information regarding the order of collection of the different fractions of each sample, the provided SOP was revised and this information was not included, neither. Please clarify. See recommendation on comment # 5.a.

**BMSMC Response:**

Groundwater sampling parameters were collected in the following order:

- VOCs
- VPH
- Low Molecular Weight Alcohols
- SVOCS, including SIM analysis for 1,4-Dioxane and Naphthalene
- EPH
- Organochlorine Pesticides (when applicable)

It is noted that groundwater samples for VPH analysis were collected prior to those for Low Molecular Weight Alcohols since VPH has a higher Henry's Law constant. In addition, SVOCS including 1,4-Dioxane and Naphthalene were then collected in the same container. Finally, samples for EPH were collected prior to those for Organochlorine Pesticides since EPH has a higher Henry's Law constant. The order of the collection of these three fractions is different from that recommended by PREQB, but is technically sound.

Future Work Plans will specify the order of collection of the sampling parameters.

**Recommendation:**

The response to this comment is acceptable but the revised SOPs provided in Attachment A8 do not appear to incorporate the PREQB requested changes and should be revised accordingly since they will be used in future work plans.

9. **Original PREQB Comment:**

Section 5. (Data Reporting): This section should indicate that any Sampling and Analysis Report and/or Technical Memoranda will be submitted to the PREQB, in addition to the one that will be submitted to the USEPA.

**BMSMC Response:**

All Work Plans, Sampling and Analysis Reports, and Technical Memoranda will continue to be submitted to both the USEPA and PREQB. Future Work Plans will explicitly state the submittal of the documents to both agencies.

**Recommendation:**

10. Table 2:

**a. Original PREQB Comment:**

In some cases the Risk-Based Screening Level for Tapwater included at Table 2 correspond to the USEPA RSLs Table with HQ=1, while for other the USEPA RSLs corresponds to Table with HQ=0.1. In addition, the table does not makes the clarification to which table it corresponds, nor does the SAP presents the reason or rationale for the selected values from one table or the other. This needs to be clarify and notes should be added to the table.

**BMSMC Response:**

RSLs for non-carcinogenic compounds listed in Table 2 are for a target hazard quotient (HQ) = 1.0. The non-carcinogenic compounds are Isobutyl Alcohol, Isopropyl Alcohol, tert-Amyl Alcohol, Tetrahydrofuran, 2-Methylnaphthalene, Xylenes, VPH (low aromatic fraction), and EPH (medium aromatic fraction). Footnotes will be added to Table 2 to indicate this. A revised Table 2 is provided in Attachment A3.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 2 (Attachment A3).

**b. Original PREQB Comment:**

Notice that the USEPA RSLs Table with a HQ=0.1 is more protective of the groundwater than the table with a HQ=1.0, and that the Puerto Rico Water Quality Standards Regulation was amended on April 27, 2016. Both of these revisions must be considered when establishing the action levels for the project.

**BMSMC Response:**

For compounds that have both a USEPA tap water RSL and a PRWQS, the lower of the tap water RSL and Puerto Rico Water Quality Standards will be used for groundwater delineation. In Table 2, tap water RSLs for non-carcinogenic compounds are based on a HQ=1.0 and tap water RSLs for carcinogenic compounds are based on a risk of 10<sup>-6</sup>. Puerto Rican Water Quality Standards for human health criteria are based on a carcinogenic risk of 10<sup>-5</sup>. Action levels for non-carcinogenic compounds (e.g. tert-Butyl Alcohol) that are derived from the December 2014 PREQB Regulations for the Control of Underground Storage Tanks (PREQB, 2014) are based on a HQ=1.0. Footnotes were added to Table 2 accordingly and a revised Table 2 is provided in Attachment A3.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 2 (Attachment A3).



11. Table 4:

**a. Original PREQB Comment:**

The table does not have a note indicating that the Action Levels being presented correspond to the Protection of Groundwater SSLs. Notice that in the USEPA RSLs there are soil screening levels for Residential Soil and Industrial Soil, in addition to the Protection to Groundwater SSLs. The table should be revised so it contains a note indicating that, when it is refereeing to the "Source of the Action Level" being presented in the table, this corresponds to the Protection of Groundwater SSLs. Notice that any revision in the SAP tables may be needed in the QAPP included in Appendix A of the SAP.

**BMSMC Response:**

As titled, Table 4 presents the proposed protection of groundwater screening levels for soil COPCs. As noted in Table 4, the source of the proposed protection of groundwater soil screening level (residential soil, risk-based, MCL-based, or PREQB leachability-based) is also provided in Table 4. Table 4 has been updated with the May 2016 USEPA RSLs and the December 2014 PREQB leachability-based screening levels, as appropriate. A revised Table 4 is provided in Attachment A4.<sup>2</sup>

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 4 (Attachment A4).

**b. Original PREQB Comment:**

Notice that the USEPA RSLs Table was revised on May 2016, and that the Puerto Rico Water Quality Standards Regulation was revised on April 27, 2016. Both of these revisions must be considered when establishing the action levels for the project. The fact that the USEPA RSL table was revised on May 2016 (in which the June 2015 values may no longer be the same or may more stringent), and that the Puerto Rico Water Quality Standards Regulation were revised on April 27, 2016 (which is more stringent than the RSLs for certain COPCs), must be considered to establish the Action Levels for this project.

**BMSMC Response:**

The May 2016 USEPA RSLs and the April 27, 2016 PRWQS will be considered when establishing the action levels for the project. For those COPCs where the PRWQS is more stringent, this action level will be used. In addition, action levels provided in the December 2014 PREQB Regulations for the Control of Underground Storage Tanks (EQB, 2014) will be used for compounds for which a USEPA RSL and PRWQS has not been established. A revised Table 4 is provided in Attachment A4.

---

<sup>2</sup> Table 3 Proposed Target Groundwater Concentration for Vapor Intrusion Action Levels for Groundwater COPCs has been updated using the USEPA Vapor Intrusion Screening Level (VISL) Calculator Version 3.5.1, May 2016 RSLs and Table 5 Proposed Residential and Commercial Direct Contact Action Levels for Soil COPCs has been updated with the May 2016 USEPA RSLs. Residential direct contact action levels for COPCs in soil have also been added to Table 5. Revised Table 3 and Table 5 are also provided in Attachment A4.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 4 (Attachment A4).

## 12. Table 6:

**a. Original PREQB Comment:**

Although the "*Method Detection Limit*" (MDL) for all of the COPCs listed in this table are below the lowest proposed action levels, in the case of the "*Reporting Limit*" (RL) for Benzyl Chloride, tert-Amyl Alcohol, Trichloroethene, and Vinyl Chloride, these are above the action levels. For all test methods both the MDL and the RL must be established below the Action Levels selected for this project for all of the COPCs or at least, when this is the case, please specify how the data will be managed for this cases.

**BMSMC Response:**

As noted by PREQB, the MDLs for Benzyl Chloride, tert-Amyl Alcohol, Trichloroethylene, and Vinyl Chloride are below their proposed groundwater action levels. However, the RLs for these compounds exceed their proposed action levels. This is a limitation of the analytical method. Since the proposed groundwater action levels for these compounds occurs between their MDLs and RLs, some uncertainty will exist whether the actual analyte concentrations exceeds action levels. The level of uncertainty is smaller for analytes where the action level is only marginally lower than that RL. In addition, the level of uncertainty is mitigated in part since all positive results are reported to the MDLs, which are lower than the RLs by factors of approximately 3 to 24. The actual impact of the sensitivity of the analytical methods will be evaluated as part of the uncertainty section of the risk assessment.

**Recommendation:**

The response to this comment is partially acceptable. BMSMC should direct their analytical laboratory to report concentrations that fall between the MDL and RL and qualify these results as estimated (J-flag). In addition, the adequacy of the RLs should be addressed when comparing the results to action levels (i.e., comparison of the results to the action levels presented in the technical memoranda and release assessment report) and not solely in the uncertainty section of the risk assessment.

**b. Original PREQB Comment:**

The table does not makes reference through a footnote of the source of the "lowest proposed groundwater action level" used for this table. The table should include footnotes indicating the source of the "lowest proposed groundwater action level" (e. g. May 2016 USEPA Regional Screening Level for Tapwater), and make reference to the Table in the document containing this value (e.g. Table 2, Table 3, etc.).

**BMSMC Response:**

Footnotes have been added to Table 6 that indicate the source of the lowest proposed action level for each COPC. A revised Table 6 is provided in Attachment A5.



**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 6 (Attachment A5).

**Original PREQB Comment:**

Notice that any revision in the SAP tables may be needed in the QAPP included in Appendix A of the SAP.

**Recommendation:**

BMSMC specifically addressed Comment #12a and #12b, but BMSMC should clarify whether changes were carried throughout the QAPP and appendices.

13. Table 7:

**a. Original PREQB Comment:**

The MDL and the RL indicated in Table 7 for 1,4-Dioxane, Benzo(a)anthracene, and Nitroso-di-n-propylamine are above the Action Level.

**BMSMC Response:**

Table 7 lists the lowest proposed soil action levels for 1,4-Dioxane, Benzo(a)anthracene, and nNitroso-di-n-propylamine, which are the protection of groundwater soil screening levels (SSLs). The MDLs and RLs for these compounds are above the SSLs. This is a limitation of the analytical methods. It should be noted that SSLs are derived using a conservative model for leaching of constituents of concern from the soil to the groundwater. The SSLs listed in Table 7 are for a dilution-attenuation factor (DAF) of 1, which may be additionally conservative. Furthermore, groundwater sampling for these compounds was performed at on-site monitoring wells during the Phase 1 Release Assessment Program and the wells will continue to be sampled during future groundwater sampling events. The data will be used to evaluate the actual impact to groundwater. The impact of the sensitivity of the analytical methods will be evaluated as part of the uncertainty section of the risk assessment.

It should also be noted that the residential and industrial direct-contact soil action levels for the compounds, which are significantly greater than the SSLs, do not exceed the MDLs and RLs. Thus, there is no issue with respect to the detection limits for direct-contact soil action levels.

**Recommendation:**

Refer to the recommendation provided for Comment #12a.

**b. Original PREQB Comment:**

The RL indicated in Table 7 for Methylene Chloride, tert-Amyl Alcohol, Naphthalene, 1-Methylnaphthalene, and VPH (Low Aromatic Fraction of TPH).

**BMSMC Response:**

Table 7 lists the lowest proposed soil action levels for Methylene Chloride, tert-Amyl Alcohol, Naphthalene, 1-Methylnaphthalene, and VPH (Low Aromatic Fraction of TPH), which are the protection of groundwater soil screening levels (SSLs). The MDLs for these compounds are below the SSLs. The RLs are above the SSLs, however this is a limitation of the analytical methods. As per the response to Comment 13a, SSLs are derived using a conservative model and a DAF of 1. Furthermore, groundwater sampling for these compounds was performed at on-site monitoring wells during the Phase 1 Release Assessment Program and the wells will continue to be sampled during future groundwater sampling events. The data will be used to evaluate the actual impact to groundwater. The impact of the sensitivity of the analytical methods will be evaluated as part of the uncertainty section of the risk assessment.

It should also be noted that the residential and industrial direct-contact soil action levels for the compounds, which are significantly greater than the SSLs, do not exceed the RLs. Thus, there is no issue with respect to the detection limits for direct-contact soil action levels.

**Recommendation:**

Refer to the recommendation provided for Comment #12a.

**c. Original PREQB Comment:**

The table does not make reference through a footnote of the source of the "lowest proposed groundwater action level" used for this table.

**BMSMC Response:**

Footnotes have been added to Table 7 that indicate the source of the lowest proposed action level for each COPC. A revised Table 7 is provided in Attachment A6.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 7 (Attachment A6).

**14. Original PREQB Comment:**

Tables 8 and 9: Table 9 indicates "Commercial" in the column corresponding to the "Protection of Groundwater" action levels for some of the wells (on-site wells, not in the eastern and southern fences); even though, in the action levels selected and presented in Tables 2-5, does not include "commercial" action levels for the protection of groundwater for all of the COPCs. This needs to be clarified.



**BMSMC Response:**

As discussed above soil and groundwater analytical data will be compared to residential and commercial exposure pathways. Table 9 has been updated to indicate both residential and commercial exposure pathways will be evaluated for all analytical samples collected during Phase 1 activities. A revised **Table 9** is provided in **Attachment A7**.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Table 9 (Attachment A7).

**15. Appendix B-Field Sampling Standard Operating procedures:**

**a. Original PREQB Comment:**

None of the Field SOPs provided were signed by the persons preparing and approving them. Copies of the Field SOPs with the signature of the persons preparing and approving them must be provided. These may be done electronically.

**BMSMC Response:**

Field SOPs signed by the persons preparing and approving them will be incorporated into all future QAPPs for this project and are provided in **Attachment A8**.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into Field SOPs (Attachment A8).

**b. Original PREQB Comment:**

The SOPs GW-1, SS-1, and SS-4 does not have a decontamination sections, nor does it refers the reader to SOP ED-1 (Equipment Decontamination). Please revise SOPs GW-1, SS-1, and SS-4 so they refer the reader to SOP ED-1 (Equipment Decontamination).

**BMSMC Response:**

SOPs GW-1, SS-1, and SS-4 have been revised to refer the reader to SOP ED-1 (Equipment Decontamination) and will be incorporated into all future QAPPs for this project, as appropriate. Revised SOPs are provided in Attachment A8.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into SOPs GW-1, SS-1, and SS-4 (Attachment A8).

**c. Original PREQB Comment:**

SOP QA-1 (QA / QC Samples) on the parameters for which the QA/QC samples will be analyzed for, except for the Trip Blank. SOP QA-1 should established that all of the QA/QC Samples, except for the Trip Blank, will be analyzed for the same parameters than the rest of the samples.

**BMSMC Response:**

SOP QA-1 has been revised and will be incorporated into all future QAPPs for this project, as appropriate. The revision establishes that all of the QA/QC Samples, except for the trip blanks, will be analyzed for all of the parameters for which the rest of the sample will be analyzed. Revised SOPs are provided in Attachment A8.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into SOP QA-1 (Attachment A8).

**d. Original PREQB Comment:**

The SOP SS-1 (Soil Sampling using Hollow Stem Auger and Direct Push does not establish the specific order of collection of the different fractions of a sample, nor does it contain a section that describes the homogenization process required for all of the soil sample fractions, except for Volatile Organic Compounds. Please revise so it contains a section that describes the homogenization process required for all of the soil sample fractions, and a list with the order of fraction collection as follows:

- 1) VOCs
- 2) Low Molecular Weight Alcohols
- 3) VPH
- 4) SVOCs
- 5) Organochlorine Pesticides (when applicable)
- 6) 1,4-Dioxane and Naphthalene
- 7) EPH

**BMSMC Response:**

Discrete soil samples were collected for VOCs, VPH, and low molecular weight alcohols in the following order:

- VOCs
- VPH
- Low Molecular Weight Alcohols

It is noted that soil samples for VPH analysis were collected prior to those for Low Molecular Weight Alcohols since VPH constituents have higher vapor pressure. The order of the collection of these three fractions is different from that recommended by EQB, but is technically sound.

The sample volume used for the collection of SVOCs, including SIM analysis for 1,4-Dioxane and Naphthalene, EPH, and organochlorine pesticides, if collected, was placed into a decontaminated stainless steel bowl and homogenized using a decontaminated stainless-steel spoon. The homogenized soil was then placed in two sample containers. The first container included the sample volume for SVOC, SIM analysis for 1,4-Dioxane and Naphthalene, and Organochlorine Pesticides (when applicable). The second container included the sample volume for EPH analysis.



Future Work Plans will list the order of collection of the sampling parameters and SOP SS-1 has been revised accordingly and is provided in Attachment A8.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into SOP (Attachment A8).

**VI. QUALITY ASSURANCE PROJECT PLAN (SAP-APPENDIX A):**

**16. Original PREQB Comment:**

Worksheet #3 (Project Organization): This organizational chart does not have included the PREQB Project Manager (Mrs. Gloria Toro Agrait) and Quality Assurance Officer (Mrs. Frances M. Segarra Román), who also oversights the corrective actions of the project and the implementation of the QA System being proposed in this QAPP. Please revise and include.

**BMSMC Response:**

Worksheet #3 (Project Organization) has been revised to include the PREQB Project Manager and Quality Assurance Officer in the organization chart. The revised worksheet, which is included in Attachment A9, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into QAPP Worksheet #3 & #5: Project Organization and QAPP Distribution (Attachment A9).

**17. Original PREQB Comment:**

Worksheet # 5 (Distribution List): The list does not includes the name and information of the PREQB Project Manager (Mrs. Gloria Toro Agrait) and Quality Assurance Officer (Mrs. Frances M. Segarra Román), who also oversights the corrective actions of the project and the implementation of the QA System being proposed in this QAPP. Please revise to include the following information:

QAPP Recipient Name	Title	Organization	Telephone Number	E-mail Address
Gloria M. Toro Agrait	RCRA HWP Project Manager	PREQB	787-767 8181, Ext 3586	gloriatoro@jca.pr.gov
FrancesM. Segarra Roman	RCRA HWP Quality Assurance Officer	PREQB	787-767- 8181, Ext 3575	francessegarra@jca.pr.gov

**BMSMC Response:**

Worksheet #5 (Distribution List) has been revised to include the PREQB Project Manager and Quality Assurance Officer in the organization chart. The revised worksheet, which is included in Attachment A9, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into QAPP Worksheet #3 & #5: Project Organization and QAPP Distribution (Attachment A9).

18. **Original PREQB Comment:**

Worksheet #6 (Communication Pathways): This table does not contains the PREQB and EPA Officials in the "QAPP and SAP Amendments" row and who will be receiving the drafts of these documents for review and approval. The "Communication Pathways" table should be revised so it contains the following PREQB and EPA Officials in the "QAPP and Sampling Plan Amendments" row:



Communication Driver	Organization	Name	Contact Information	Procedure
QAPP and Sampling Plan Amendments	USEPA	Socorro Martinez	787-977-5886 787-414-2162	All QAPP and Sampling Plan amendments will be submitted for approval to the USEPA Project Manager, who will review and approve it with the concurrence or the PREQB PM and QAO. Any major changes to the QAPP must be review and approved by the USEPA and with concurrence of the PREQB.
QAPP Amendments	PREQB	Gloria M. Toro Agrait; Frances M Segarra	787-767-8181 Ext. 3586 Ext. 3575	All QAPP and Sampling Plan amendments will be submitted for approval to the USEPA Project Manager, who will review and approve it with the concurrence or the PREQB PM and QAO. Any major changes to the QAPP must be review and approved by the USEPA and with concurrence of the PREQB.

**BMSMC Response:**

Worksheet #6 (Communication Pathways) has been revised to include EPA and PREQB officials and corresponding information in the QAPP and Sampling Plan Amendments row. The revised worksheet, which is included in Attachment A10, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and is adequately incorporated into QAPP Worksheet #6: Communication Pathways (Attachment A10).

19. **Worksheet #11 ( Project/Data Quality Objective - Action Levels):**

This section of the Worksheet #11 present general information of the sources for the selection of the action/screening levels, including the November 2015 EPA Regional Screening Levels, which were revised on May 2016. This section of the Worksheet #11 should be revised so it includes the following sources:

- a. **Original PREQB Comment:** May 2016 USEPA Regional Screening Levels (<https://www.epa.gov/risk/regionalscreening-levels-rsls-generic-tables-may-2016>).

**BMSMC Response:**

Worksheet #11 (Project/Data Quality Objective-Action Levels) has been revised to include May 2016 USEPA Regional Screening Levels. The revised worksheet, which is included in Attachment A1, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into QAPP Worksheet #11: Project/Data Quality Objectives (Attachment A1).

- b. **Original PREQB Comment:**

Puerto Rico Water Quality Standards Regulations. April 27, 2016 (2016-PRWQSR).

**BMSMC Response:**

Worksheet #11 (Project/Data Quality Objective-Action Levels) has been revised to include April 2016 Puerto Rico Water Quality Standards for groundwater screening levels. The revised worksheet, which is included in Attachment B1, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into QAPP Worksheet #11: Project/Data Quality Objectives (Attachment A1).

20. Worksheet #12-1 through 12-5:

- a. **Original PREQB Comment:**

Trip Blanks- In the "Measurement Performance Criteria" column for all of the test methods "1 per cooler", but does not indicate "per cooler with samples for volatile organic compound analysis".

**BMSMC Response:**

For the Phase 1 Field Program, one trip blank was included in each cooler that contained samples for VOC analysis.

Worksheets #12-1 through 12-6 (Measurement Performance Criteria) have been revised to indicate that trip blanks will be collected per cooler with samples for volatile organic compound analysis. The revised worksheets, which are included in Attachment A11, will be incorporated into all future QAPPs for this project, as appropriate.



**Recommendation:**

The response to this comment is acceptable and adequately incorporated into QAPP Worksheet #12-1: Measurement Performance Criteria – 8260C and QAPP Worksheet #12-2: Measurement Performance Criteria – 8279D/8270D SIM (Attachment A11).

**b. Original PREQB Comment:**

Equipment Blanks - In the "Measurement Performance Criteria" column for all of the test methods a frequency of collection for field duplicate of "1 per 20 samples" instead of "1 per day, whenever using reusable sampling equipment/media".

**BMSMC Response:**

For the Phase 1 Field Program, equipment blanks were collected at a minimum in accordance with the Phase 1 SAP QAPP. The QAPP specified that equipment blanks would be collected at a frequency of 1 per 20 samples per media. During the collection of in-situ groundwater samples, daily equipment blanks were collected for VOC analysis and weekly equipment blanks were collected for full analytical parameter analysis. This resulted in 23 additional VOC equipment blanks and 4 additional full parameter equipment blanks for in-situ groundwater samples.

A review of the data validation reports associated with equipment blank analytical results indicates the measurement performance criteria for all equipment blanks were met. Although the frequency of equipment blank collection was less than the number now requested by PREQB, the data quality and data usability of all Phase 1 program samples are considered acceptable for decision making purposes.

For future phases of the assessment, equipment blanks will be collected at a frequency of one per day whenever reusable sampling equipment/media is used to collect program samples. Worksheets #12-1 through 12-6 (Measurement Performance Criteria) have been revised to indicate that equipment blanks will be collected at a frequency of one per day whenever using reusable sampling equipment/media. The revised worksheets, which are included in Attachment A11, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

It appears that BMSMC revised QAPP Worksheet #12 to states: "1 per day, whenever using reusable sampling equipment/media". In the future, equipment blanks should be collected 1 per 20 samples with a minimum of one per day.

**c. Original PREQB Comment:**

Field Blank -This table does not includes Field Blanks, which are required in a frequency of "1 per day of sampling".

**BMSMC Response:**

In accordance with the Phase 1 SAP QAPP, field blanks were not collected during the Phase 1 Field Program. A review of the data validation reports associated with other QA/QC samples collected during the Phase 1 Field Program to evaluate field representativeness, accuracy, and bias (e.g., trip blanks and equipment blanks), indicated that all measurement performance criteria for these samples were met. Although field blanks were not collected as now requested by the PREQB, the data quality and data usability of all Phase 1 program samples are considered acceptable for decision making purposes.

For future phases of the assessment, field blanks will be collected at a frequency of one per day whenever reusable sampling equipment/media is used to collect program samples. Worksheets #12-1 through 12-6 (Measurement Performance Criteria) have been revised to indicate that field blanks will be collected at a frequency of one per day. The revised worksheets, which are included in Attachment A11, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into QAPP Worksheets #12-1 through #12-6 (Attachment A11).

**21. Original PREQB Comment:**

Worksheet #14/16 (Project Task & Schedule): In the list of document to be kept in the Project File (see the documentation and record section of this worksheet) (page 25) it is not clear if the Analytical Reports will include the raw data of the test results in addition to the Certificate of Analysis. Next to the words "Analytical reports" that is in the list of document to be kept in the Project File (see the documentation and record section of this worksheet) (page 25) a parenthesis with the following "(Certificate of Analysis and Raw Data)".

**BMSMC Response:**

Worksheet #14/16 (Project Task & Schedule) has been revised to include (Certificate of Analysis and Raw Data) in the description of the Analytical Reports. The revised worksheet, which is included in Attachment A12, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into QAPP Worksheet #14/16: Project Tasks & Schedule (Attachment A12).

**22. Original PREQB Comment:**

Worksheets 15-1 through 15-13: See the above SAP Comments 10 through 14, which may also apply to the information in this tables and revise as appropriate.



**BMSMC Response:**

Worksheets #15-1 to 15-14 have been revised and included as Attachment A13, and will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and the relevant information requested in SAP Comments #10 through #14 were added into QAPP Worksheet #15-1 to 15-14 (Attachment A13).

23. Worksheet #20 (Field QC Summary) and Worksheets # 28-1 through 28-6 (Analytical Quality Control and Corrective Actions):

**a. Original PREQB Comment:**

Based upon the information in both in Worksheets 28-1 through 28-6, the Equipment Blanks are not being proposed to be collected in the required frequency of “1 per day, whenever using reusable sampling equipment/media”, which lead to the determination of a smaller amount of Field Blanks in Worksheet # 20. See the above QAPP Comment 20 and revise as appropriate.

**BMSMC Response:**

Worksheets # 28-1 through 28-6 (Analytical Quality Control and Corrective Actions) have been revised to indicate that equipment blanks will be collected at a frequency of one per day whenever using reusable sampling equipment/media. See also response to comment 20b (above).

**Recommendation:**

Refer to the recommendation in Comment #20b.

**b. Original PREQB Comment:**

Among the QA/QC samples included in Worksheets 28-1 through 28-6, the Field Blanks and Field Duplicates were not included. See the above QAPP Comment 20 and revise as appropriate.

**BMSMC Response:**

Worksheets # 28-1 through 28-6 (Analytical Quality Control and Corrective Actions) have been revised to indicate that field blanks and field duplicates will be collected. See also response to comment 20c (above). The revised worksheets, which are included in Attachment A14, will be incorporated into all future QAPPs for this project, as appropriate.

**Recommendation:**

The response to this comment is acceptable and adequately incorporated into QAPP Worksheets #28-1 through #28-6 (Attachment A14).